

5.5 Mitigation Measures

As required by the Council on Environmental Quality, this section considers mitigation measures that could reduce or offset the potential environmental consequences of waste management activities and that are not integral to the alternatives analyzed in this EIS. Based on the potential environmental effects described in this chapter for each alternative, DOE would consider establishing additional programs to reduce environmental impacts. Section C.8 discusses mitigation measures that could reduce or offset potential impacts at Hanford under the Minimum INEEL Processing Alternative.

5.5.1 GENERAL MITIGATION MEASURES

For the most part, DOE has not identified specific measures other than management controls and standard engineering practices that would reduce impacts beyond the actions that are part of each alternative. If future activities were likely to lead to impacts beyond those described in Chapter 5 of this EIS, mitigation action planning would begin concurrent with consideration of the need for appropriate National Environmental Policy Act documentation.

Mitigation measures have been implemented as a result of past or current activities related to HLW management. Current mitigation measures include administrative or management controls and engineered systems (e.g., backup systems, failsafe designs) that have been required by environmental regulations or DOE Orders and implemented through operating procedures. Chapter 6 describes the laws and regulations that affect HLW management. These activities would continue under each alternative described in Chapter 3.

Management controls include erosion and sedimentation control plans instituted through stormwater pollution prevention plans and their permits; spill prevention control and countermeasures plans; and best management plans. These plans and others are referenced throughout Chapters 4 and 5.

5.5.2 SPECIFIC MITIGATION MEASURES

For the Idaho HLW & FD EIS, DOE lists below mitigation measures that may be of particular importance to stakeholders. Although none of the alternatives would result in major impacts to the environment, DOE, in seeking to eliminate, avoid, or reduce even small impacts, proposes the following actions. These actions appear in this EIS in the appropriate environmental sections. Socioeconomic resources including environmental justice issues; utility and energy resources; traffic and transportation issues; facility accident considerations; and decontamination and decommissioning do not have specific mitigation measures listed in this EIS. However, impact reduction and minimization is inherent in planning for and carrying out these aspects of HLW management. The following are examples of such inherent measures.

Land Use

Depending on which waste processing alternative is chosen, DOE may build a Low-Activity Waste Disposal Facility. Once filled to capacity, the Low-Activity Waste Disposal Facility would be equipped with an engineered cap sloping from centerline to ground level with a 4-percent grade. If a soil cap is used it would be revegetated with selected native plants to prevent erosion, improve the appearance of the closed facility, and blend in with the surrounding vegetation. DOE would revegetate with species indigenous to the area to restore the natural landscape to as near its original condition as possible. Post-closure monitoring would be conducted in accordance with regulatory requirements. DOE is studying the re-establishment of vegetation in areas previously burned.

Socioeconomics

For the proposed processing alternatives and facility disposition activities, different skill mixes and the number of skilled workers may change relative to current INEEL missions. In order to mitigate any impacts to the overall workforce at the INEEL, DOE will retrain and reas-

Environmental Consequences

sign workers to the extent practical once the alternative has been selected. Generally, with adequate retraining, no significant reduction in the work force is necessary. If a reduction in force becomes necessary, site contractors generally provide outplacement aid to displaced workers who choose to seek employment offsite.

Cultural and Aesthetic Resources

Potential cultural resource areas on the INEEL are considered to be eligible for nomination to the National Register of Historic Places until they have been formally evaluated; therefore, these sites would not be disturbed without formal evaluation. DOE has standing “Stop Work” stipulations in the event that cultural resources or human remains are discovered during any part of project implementation. If these resources or remains are found, DOE would stop project construction or operation and consult the State Historic Preservation Officer and the Shoshone-Bannock Tribes in accordance with the National Historic Preservation Act and Native American Graves Protection and Repatriation Act. Before any facility disposition occurs, DOE would execute a Memorandum of Agreement with the State Historic Preservation Officer to ensure that potential adverse impacts from alteration or demolition would be mitigated.

DOE would avoid any construction activities and ground disturbances associated with an alternative that could result in a visual impact that is incompatible with the general setting and the Bureau of Land Management Visual Resource Management Class designation for the area. DOE will consult with the Shoshone-Bannock Tribes before it implements projects that could have impacts to resources of importance to the tribes.

Fugitive Dust

Major construction activities often produce relatively high levels of fugitive dust in the vicinity of the activity and short-term, localized levels of particulate matter, which, if not mitigated, could exceed applicable standards. As specified in Sections 650 and 651 of Rules for the Control of Air Pollution in Idaho, all reasonable precau-

tions would be taken to prevent the generation of fugitive dust. Dust generation would be mitigated by the application of water, use of soil additives, and possibly administrative controls (such as halting construction during high-wind conditions). These mitigation measures would also be implemented in the event that dust or erosion were to impact visual resources.

Flood Hazards

Based on information provided in Section 4.8.1.3 and 5.2.7.3, it is expected that some form of flooding mitigation will be required to protect INTEC facilities from the hazards associated with 100- to 500-year return period floods. Since mitigation can affect other INEEL facilities as well as INTEC, proposed mitigation activities at the INEEL would be based on technical concurrence of the flood hazard for various return periods and review of proposed mitigation actions by the INEEL Natural Phenomena Committee and facility managers. The final Mitigation Action Plan (see 10 CFR 1021.331) will be referenced in the Record of Decision and formalized after the Record of Decision is signed. Potential flood mitigation may include rebuilding or modifying the INEEL diversion dam, the Lincoln Boulevard Bridge, or other infrastructures that could exacerbate flooding along the Big Lost River on the Site. The specific actions delineated in the Mitigation Action Plan will be determined by selection of the preferred waste processing alternative, the decisions made in the Record of Decision, and any additional site-specific requirements generated by the incorporation of design requirements into the INEEL architectural and engineering standards to mitigate Big Lost River hazards. As this process evolves, a more detailed description of proposed mitigation activities will be made available to the public. Proposed flood mitigation actions may require additional National Environmental Policy Act review.

Radiation Safety

DOE relies on a program to keep worker exposures to radiation and radioactive material as low as reasonable achievable (ALARA). An effective ALARA program must balance minimizing

individual worker doses from external and internal sources with the goal to minimize the collective dose of all workers in a given group. ALARA evaluations must consider individual and collective doses to ensure the minimization of both. Using many workers to perform extremely small portions of a task would reduce the individual worker dose to very low levels. However, the frequent worker changes would make the work inefficient, with the result that the total dose received by all the workers would be significantly higher than if fewer workers received slightly higher individual doses. INEEL worker doses have typically been well below DOE worker exposure limits, and DOE will continue to use the ALARA program to maintain this level of safety.

Institutional Controls

Regardless of the facility disposition option chosen, DOE would maintain adequate institutional controls (e.g., fences or warning signs) to limit access to areas that pose a significant health or safety risk to workers until at least 2095, when DOE is assumed to relinquish institutional control of the site. Areas formerly occupied by waste management facilities would not, as long as DOE maintains institutional control, be open to the public for recreational uses or added to the acreage leased to local ranchers for grazing.

Waste Minimization

The INEEL has programs and policies in place that require projects to include physical or engineered processes to reduce or eliminate waste generation, and reduce the hazard, toxicity, and quantity of waste generated. These programs, which are discussed in more detail in Section 4.14, also specify that waste be recycled to the extent possible before storage or disposal. It is reasonable to assume that these same policies and requirements will be implemented under the proposed action and will effectively minimize the quantities of all types of waste that will require treatment, storage, and/or disposal.

5.6 Unavoidable Adverse Environmental Impacts

This section summarizes potential unavoidable adverse environmental impacts associated with the alternatives analyzed in this EIS. Unavoidable impacts are impacts that would occur after implementation of all feasible mitigation measures. Section C.8 contains a discussion of potential unavoidable adverse impacts at Hanford associated with the Minimum INEEL Processing Alternative.

5.6.1 CULTURAL RESOURCES

Construction activities would be undertaken within the INTEC under all alternatives. Impacts to cultural resources from these activities would be negligible because the construction would occur in previously disturbed areas; however, the potential for subsurface discoveries of cultural resources is possible. Ground disturbance has the potential to affect archaeological, traditional, and paleontological sites located on the surface or buried beneath recent sediments. Alteration of the setting associated with a traditional, archaeological, or historic resource through the introduction of additional noise, pollution, contamination, or lighting may adversely affect those resources located both inside and outside of the INTEC fence.

Under the Separations Alternative, approximately 22 acres of open land outside of the INTEC fence could be developed for a Low-Activity Waste Disposal Facility. Although this facility would be located in a previously disturbed area, surface or subsurface cultural resources could be discovered at the site and the potential for adverse impacts would be unavoidable. Mitigation measures, such as creation of a scientific record, would minimize, but not completely eliminate, impacts to cultural resources discovered during development of a disposal facility.

Environmental Consequences

The unchecked deterioration of historical structures at the INTEC could have a long-term adverse impact on historic resources. Some potentially adverse impacts could be avoided by preserving the historic value of structures through appropriate research and documentation or by conducting limited rehabilitation of historic structures. Adverse impacts to potentially significant historic structures could occur under all alternatives. These potential impacts could be minimized, but not completely eliminated, through scientific study and documentation. Memoranda of Agreement with the State Historic Preservation Officer are in place or would be negotiated to ensure that adverse impacts from alteration or demolition of INTEC facilities would be mitigated using the process described in Section 4.4.5. Adverse impacts may also occur to archaeological sites of importance to Native Americans and to areas or resources of traditional or religious importance.

Temporary visual degradation of the cultural setting of the INEEL and adjacent lands would occur as a result of air emissions under all alternatives except the No Action Alternative. Processing operations are anticipated to be complete by 2035, and visual degradation of INEEL cultural resources from stack emissions would cease at that time.

5.6.2 AESTHETIC AND SCENIC RESOURCES

Construction of new facilities and removal of other facilities would result in a change in the visual setting at the INTEC. The INTEC is an industrial facility distantly removed from points along U.S. Highways 20 and 26 where the facility is visible to the public. Changes in the specific configuration of facilities within the INTEC would change the viewscape to some degree, but those changes would be unlikely to be noticeable to the casual observer.

Soil erosion could occur during construction or demolition activities, and the release of fugitive dust particles might temporarily affect visibility in localized areas. Dust control measures, such as watering, would minimize, but not completely

eliminate, these transient impacts to the viewscape.

Emissions of fine particulate matter and nitrogen dioxide can result in an impairment of visual resources. Emission rates for these pollutants under the waste processing alternatives are not expected to exceed levels currently or previously experienced by INEEL sources; therefore, the “visual impact” of these alternatives is already reflected in existing baseline conditions. Nevertheless, conservative visibility screening analysis has been performed to evaluate the relative potential for visibility impacts between alternatives. This analysis included a quantitative assessment of contrast and color shift parameters and comparison of results against numerical criteria which define potential objectionable impacts. The views analyzed were at Craters of the Moon Wilderness Area and Fort Hall Indian Reservation. The results of the visibility analysis indicate that emissions from each of the waste processing alternatives would not result in deleterious impacts on scenic views at Craters of the Moon Wilderness Area or Fort Hall Indian Reservation (including the view to Middle Butte, an important cultural resource to the Shoshone-Bannock Tribes). The highest results were obtained for the Hot Isostatic Pressed Waste and Planning Basis Options. For color shift, the highest calculated value at Craters of the Moon was about 0.5, compared to an acceptability criterion of 2.0. For contrast, the highest calculated value was 0.004, compared to an acceptability criterion of 0.05. Values at Fort Hall were about one-half the Craters of the Moon values. The calculated values conservatively assume that no abatement systems are present on the fossil fuel-burning equipment used to generate steam; if air pollution control systems are employed (which is a reasonable assumption), these values would decrease in rough proportion to the removal efficiency of the control equipment.

Generators and night lighting associated with facilities at INTEC would increase the visible and audible intrusion to the aesthetic environment in the vicinity of the INTEC but would have little or no impact at the nearest points of public access along public highways.

5.6.3 AIR RESOURCES

Construction or demolition activities would result in short-term increases of particulate emissions in localized areas. Emissions of criteria pollutants, toxic air pollutants, and radionuclides may result in some degradation of air quality under all alternatives.

Emissions of criteria pollutants would be greatest under the Separations Alternative. State of Idaho significance thresholds would be exceeded for emissions of at least one criteria pollutant under all waste processing alternatives and options except the No Action Alternative and Minimum INEEL Processing Alternative. Increases in net emissions would be considered “major” and subject to additional analysis. Each applicable project would be subject to a permit defining air pollution control requirements.

Options that involve the greatest amount of fossil fuel combustion (most notably those under the Separations Alternative) would produce the highest emissions of toxic air pollutants as described in Section 5.2.6. Conservatively calculated air concentrations of these pollutants at the INEEL boundary would not exceed applicable standards for either carcinogenic or noncarcinogenic substances (see Section 5.2.6).

The highest radiological dose to an offsite individual would occur under the Continued Current Operations Alternative, Planning Basis Option, Hot Isostatic Pressed Waste Option, and Direct Cement Waste Option. The calculated dose to the maximally exposed offsite individual would be about 0.002 millirem per year, while the non-involved worker would receive 1.0×10^{-4} millirem per year (see Section 5.2.6). The offsite dose would be well below the National Emissions Standards for Hazardous Air Pollutants limit of 10 millirem per year. The maximum collective dose (the sum of all individual doses) to the entire population residing within 50 miles would be about 0.1 person-rem per year and would occur under the same four alternatives and options listed earlier in the paragraph. Doses for the Early Vitrification Option and Minimum INEEL Processing Alternative would be approximately 0.05 person-rem per year, and other options would be lower.

5.6.4 WATER RESOURCES

Water consumption would increase as a result of construction activities, operational activities, facility disposition, and the increased workforce at INTEC. The highest total water withdrawal during construction would occur under the Planning Basis Option (7.2 million gallons per year) and would represent a small increase over the baseline INEEL water usage (see Section 5.2.12). The highest operating phase water use would occur under the Hot Isostatic Pressed Waste Option (93 million gallons per year). INEEL water use would be well below the consumptive use water rights of 11.4 billion gallons per year (Teel 1993). The No Action Alternative would have the lowest requirement for consumptive use of water and generation of wastewater.

An unavoidable adverse impact of all alternatives would be the risk of migration of contaminants from contaminated media and areas at INTEC to the Snake River Plain aquifer. Based on the quantity of untreated material that would be left in place (approximately 800,000 gallons of mixed transuranic waste/SBW and 4,200 cubic meters of mixed HLW calcine), the greatest potential for migration of contaminants would occur under the No Action Alternative.

5.6.5 ECOLOGICAL RESOURCES

Activities described in this EIS would lead to disturbances within INTEC. The entire area has been previously disturbed; moreover, little or no wildlife cover or food exists. The disturbance of this marginal habitat within the boundary of INTEC would have a negligible impact on INEEL biodiversity and wildlife habitat.

Under the Separations Alternative and Minimum INEEL Processing Alternative, a new onsite Low-Activity Waste Disposal Facility for low-level Class A or Class C type grout could be developed. This facility would occupy approximately 22 acres and would be developed in a previously undisturbed area adjacent to INTEC. Some individual animals, including small mammals and reptiles, could be adversely impacted through displacement or mortality during devel-

Environmental Consequences

opment of the facility. Birds would likely move away from areas where active construction was ongoing.

Radionuclides released from waste processing operations could be deposited on vegetation surrounding INTEC.

Radionuclide exposure of plant and animal species in the areas adjacent to INTEC could increase slightly due to these operations. Residual radionuclides in soils surrounding INTEC, not related to the proposed action, would still potentially be absorbed by plants and consumed by animals. Although exposure to these materials could theoretically result in injury to individual animals or plants, measurable impacts to populations on or off the INEEL have not occurred and are not expected to occur as a result of the small increase in exposure resulting from treatment operations.



fatalities. All other Tank Farm closure options, disposition of the bin sets and related facilities, and other facilities would result in less than 1 latent cancer fatality.

The highest total collective dose to the offsite population from any alternative described in this EIS would occur under the Early Vitrification Option and would lead to less than one (8.5×10^{-4}) latent cancer fatality within the population residing within 50 miles of the INTEC.

As described in Section 5.2.6, DOE does not expect exposure to non-carcinogenic and carcinogenic toxic air pollutants to result in health impacts.

5.6.6 HEALTH AND SAFETY

Exposure of the workforce to radionuclides would be highest under the Direct Cement Waste Option of the Non-Separations Alternative. This exposure could potentially lead to less than 1 (0.64) latent cancer fatality within the exposed workforce. The highest collective worker dose during disposition of new facilities associated with the waste processing alternatives would result in less than one (0.10) latent cancer fatality. The highest collective worker dose from disposition of existing facilities associated with high-level waste management would occur as a result of Clean Closure of the Tank Farm and would result in an estimated 3.0 latent cancer

5.7 Short-term Use Versus Long-term Productivity of the Environment

Implementation of any of the alternatives would cause some adverse impacts to the environment and would permanently commit certain resources. Under most alternatives, adverse impacts to the environment would be of short duration and would be offset by long-term enhancements to the productivity of the region. This section compares potential short-term influences of each alternative on the environment and the associated effects on the maintenance and enhancement of long-term productivity of the environment. Section C.8 contains a discussion of the relationship between short-term uses of the environment and long-term productivity at Hanford under the Minimum INEEL Processing Alternative.

5.7.1 WASTE PROCESSING ALTERNATIVES

5.7.1.1 No Action Alternative

- **General** - Short-term uses of resources would have little or no impact on long-term environmental productivity. Under this alternative, wastes would remain untreated and newly generated wastes would continue to be processed; however, maintenance activities necessary to protect human health and the environment would continue. Under this alternative, a potential would exist for future contamination of water resources underlying INTEC.
- **Land Use** - This alternative would involve little or no additional disturbance of land. Activities would be undertaken within the developed industrial area at INTEC. No effect on long-term environmental productivity would be expected.
- **Cultural Resources** - Little or no short-term impacts to cultural resources would occur under this alternative. Continued degradation and modification of historic structures at INTEC could lead to long-term loss of data on these structures.
- **Air Quality** - Airborne emissions of criteria pollutants, toxic air pollutants, and radionuclides would be minimal and would be lower than current emissions of these pollutants. Current operational impacts have been evaluated and are within applicable standards. Therefore, impacts to air quality from the No Action Alternative would represent a short-term commitment of resources. There would be no long-term commitment of air resources under this alternative.
- **Ecology** - Little or no additional wildlife habitat would be converted to industrial uses; however, there would be a long-term loss of productivity associated with continued exposure of ecological receptors to existing contamination.

- **Waste Management** - This alternative includes only continued maintenance operations to protect human health and the environment and does not provide for long-term disposition and enhanced management of waste as required by the Federal Facility Compliance Act, INEEL Site Treatment Plan and Consent Order, and the Settlement Agreement/Consent Order between DOE and the State of Idaho. Maintenance activities conducted under the No Action Alternative would provide little or no enhancement of the environment in the long term.

5.7.1.2 Continued Current Operations Alternative

- **General** - Short-term uses of resources would have little or no impact on long-term environmental productivity. Under this alternative, existing waste management facilities and processes would continue to operate. Maintenance activities necessary to protect human health and the environment would continue and no impacts on long-term environmental productivity outside of the INTEC facility boundary would be expected.
- **Land Use** - This alternative would involve little or no additional disturbance of land. Activities would be undertaken within the developed industrial area at INTEC. No effect on long-term environmental productivity would be expected.
- **Cultural Resources** - Little or no short-term impacts to cultural resources would occur under this alternative because new development activities would occur in previously disturbed areas. Degradation and modification of historic structures at INTEC, in support of continued operation, could lead to long term loss of data on these structures.
- **Air Quality** - Short-term commitment of air resources would continue at current levels under this alternative. These

operational impacts have been evaluated and are within applicable standards. Therefore, impacts to air quality from continuing current operations would represent a short-term commitment of resources. There would be no long-term commitment of air resources under this alternative because the impacts would cease upon completion of waste processing operations.

- **Ecology** - No additional wildlife habitat would be converted to industrial use. Land contained within the INTEC facility boundary would remain an industrial area unavailable to wildlife in the long-term. Ecological receptors in the vicinity of INTEC would continue to be exposed to existing contamination.
- **Waste Management** - This Continued Current Operations Alternative would not meet the long-term disposition and enhanced management of waste as required by the Federal Facility Compliance Act, INEEL Site Treatment Plan/Consent Order, and the Settlement Agreement/Consent Order between the DOE and the State of Idaho.

5.7.1.3 Separations Alternative

The Separations Alternative includes three options: the Full Separations Option, the Planning Basis Option, and the Transuranic Separations Option. The relationship between short-term use and long-term productivity of the environment would be similar under each of these options.

- **General** - Short-term uses of resources would have little or no impact on long-term environmental productivity. Although approximately 22 acres of previously undisturbed land adjacent to INTEC would be developed and used for long-term disposal of low-level waste Class A (Full Separations Option) or low-level waste Class C (Transuranic Separations Option) type grout, long-term environmental productivity would generally be enhanced because of the

final waste forms and disposition of the waste.

- **Land Use** - This alternative would involve disturbance of 22 acres of previously undisturbed land adjacent to INTEC for development of a Low-Activity Waste Disposal Facility for Class A (Full Separations Option) or Class C (Transuranic Separations Option) type grout. This disposal facility would be located in close proximity to the existing developed area at INTEC. Other activities, including construction and operation of waste processing facilities, would be undertaken within the existing developed industrial area at INTEC. Although this alternative would require a nominal change in long-term land use of 22 acres, no effect on long-term environmental productivity would be expected because the change would occur on acreage adjacent to the INTEC industrial area.
- **Cultural Resources** - Minor short-term impacts to traditional Native American cultural resources could occur as a result of land disturbance activities through development of the Low-Activity Waste Disposal Facility. Alteration of the environmental setting would result through the introduction of additional noise and lighting during construction activities and from air pollutant emissions during waste processing. Furthermore, long-term impacts would remain as a result of the alteration of the property's setting that is of importance to areas or resources of traditional or religious importance. Demolition, modification, or deterioration of historic structures could also lead to long-term loss of historic data.
- **Air Quality** - Construction of facilities for treatment of HLW and disposal of low-level waste grout would result in short-term elevated levels of airborne emissions of particulate matter and combustion products from INTEC. Treatment processes would result in airborne emissions of criteria pollutants,

toxic air pollutants, and radionuclides. DOE has assessed these emissions and predicts them to be within applicable standards. Therefore, impacts to air quality from the Separations Alternative would represent a short-term commitment of resources. There would be a potential for visual impacts that would be defined in the permit for each facility. Impacts to air quality as described in Section 5.2.6 would occur during project construction and operation and would not result in long-term commitment of air resources beyond the life of the project.

- **Ecology** - Approximately 22 acres of open space that is presently available for use by wildlife could be converted to industrial use. The long-term loss of productivity associated with conversion of this land would be small because the land has limited value as wildlife habitat because it is located adjacent to the INTEC industrial area. Land within the INTEC facility boundary would remain an industrial area that does not provide important wildlife habitat. Although a low-level Class A or Class C type grout disposal facility would be constructed using 22 acres of previously undeveloped land, this alternative would enhance long-term productivity of the INTEC environment by decreasing the risk of exposure on surrounding biota to toxic and radioactive substances.
- **Waste Management** - This alternative would provide for long-term disposition and enhanced management of waste as required by the Federal Facility Compliance Act, INEEL Site Treatment Plan/Consent Order, and the Settlement Agreement/Consent Order between DOE and the State of Idaho.

5.7.1.4 Non-Separations Alternative

The Non-Separations Alternative includes the Hot Isostatic Pressed Waste, Direct Cement Waste, and Early Vitrification Options. Although specific details would differ slightly,

the relationship between short-term use and long-term productivity of the environment would be similar under all of these options.

- **General** - Short-term uses of resources would have little or no impact on long-term environmental productivity. Impacts would result in enhanced long-term environmental productivity as compared to the No Action or Continued Current Operations Alternatives because of the final waste forms and disposition of the waste.
- **Land Use** - This alternative would involve little or no additional disturbance of land. Activities would be undertaken within the developed industrial area at INTEC. No effect on long-term environmental productivity would be expected to land resources.
- **Cultural Resources** - Short-term impacts to cultural resources under this alternative would consist of alteration of the built environment surrounding historic structures at INTEC. Modification of historic structures and alteration of the environment containing those structures at INTEC could lead to long term loss of data on these structures.
- **Air Quality** - Construction and upgrading of facilities would result in short-term elevated levels of airborne emissions of particulate matter and combustion products from INTEC. Waste processing would result in airborne emissions of criteria pollutants, toxic air pollutants, and radionuclides. Specific quantities of these pollutants that would be released to the environment differ slightly under each option as described in Section 5.2.6. DOE has assessed atmospheric emissions of pollutants and expects them to be within applicable standards for all options. Therefore, impacts to air quality from the Non-Separations Alternative would represent an acceptable short-term commitment of resources. There would be a potential for visual impacts that would be defined in the permit for each new or upgraded

facility. Impacts to air quality as described in Section 5.2.6 would occur during project construction and operation and would not result in long-term commitment of air resources beyond the life of the project.

- **Ecology** - Little or no additional wildlife habitat would be converted to industrial uses.
- **Waste Management** - Although the details of treatment processes would differ under each option, the Non-Separations Alternative would provide for long-term disposition and enhanced management of waste as required by the Federal Facility Compliance Act, INEEL Site Treatment Plan and Consent Order, and the Settlement Agreement/Consent Order between DOE and the State of Idaho.

5.7.1.5 Minimum INEEL Processing Alternative

- **General** - Short-term uses of resources would have little or no impact on long-term environmental productivity. Maintenance activities that protect human health and the environment would continue during packaging and shipping operations and no impacts on long-term environmental productivity would be expected.
- **Land Use** - This alternative could involve disturbance of 22 acres of previously undisturbed land adjacent to INTEC for development of a Low-Activity Waste Disposal facility for the vitrified low-level waste fraction. Although this alternative could involve a nominal change in long-term land use, no effect on long-term environmental productivity would be expected.
- **Cultural Resources** - Minor short-term impacts to cultural resources could occur as a result of land disturbance activities. Modification of historic

structures or buildings at INTEC could lead to long term loss of data on these structures.

- **Air Quality** - Construction of new facilities for packaging of mixed HLW calxine would result in short-term elevated levels of airborne emissions of particulate matter and combustion products. Treatment of liquid waste would result in airborne emissions of criteria pollutants, toxic air pollutants, and radionuclides. These emissions have been assessed and would be within applicable standards (see Section 5.2.6). Therefore, impacts to air quality from the Minimum INEEL Processing Alternative would represent a short-term commitment of resources. There would be a potential for visual impacts that would be defined in the permit for each facility. Impacts to air quality as described in Section 5.2.6 would occur during project construction and operation and would not result in long-term commitment of air resources beyond the life of the project.
- **Ecology** - Approximately 22 acres of undeveloped land that is presently available for use by wildlife could be converted to industrial use. The long-term loss of productivity associated with conversion of this land would be small because the land has limited value as wildlife habitat because it is located adjacent to the INTEC industrial area. Land within the INTEC facility boundary would remain an industrial area unavailable to wildlife in the long term.
- **Waste Management** - This alternative would provide for long-term disposition and enhanced management of waste as required by the Federal Facility Compliance Act, INEEL Site Treatment Plan and Consent Order, and the Settlement Agreement/Consent Order between DOE and the State of Idaho. This alternative would enhance the long-term productivity of the INTEC environment by decreasing the risk of exposure

of onsite workers and surrounding biota to toxic and radioactive substances in the long term.

5.7.2 FACILITY DISPOSITION

- **General** - Facility disposition would have little or no impact on long-term environmental productivity.
- **Land Use** - Facility disposition would involve little or no additional disturbance of land. Activities would be undertaken within the developed industrial area at INTEC. No effect on long-term environmental productivity would be expected.
- **Cultural Resources** - Demolition or modification of historic structures at INTEC could lead to a long-term loss of historic data. Loss of this information could be minimized through documentation of historic structures prior to disposition.
- **Air Quality** - Demolition of facilities would result in short-term elevated levels of airborne emissions of particulate matter and combustion products. Impacts to air quality from facility disposition would be temporary and represent a short-term commitment of resources. There would be a potential for visual impacts during demolition and removal of structures, but this short-term impact would abate upon completion of individual projects. There would be no long-term commitment of air resources as a result of facility disposition.
- **Ecology** - Little or no additional wildlife habitat would be converted to industrial uses and there would be no long-term loss of productivity.

5.8 Irreversible and Irretrievable Commitments of Resources

Irreversible and irretrievable resource commitments are related to use of resources and the effects that consumption or permanent loss or commitment of those resources would have on future generations. Irreversible commitments occur as a result of use or destruction of a resource (e.g., fossil fuels) that cannot be replaced. Irretrievable resource commitments involve the loss in value of an affected resource.

Irreversible and irretrievable commitments of resources would potentially include land, groundwater, construction materials, and energy resources. Some other resources and materials that would be used under each alternative could be recycled and do not represent an irreversible and irretrievable commitment (e.g., structural and stainless steel used in facility construction could be recovered and recycled after the completion of project related activities). These resource commitments would be a result of construction and operation of new treatment, storage or disposal facilities; use in treatment related processes; and in disposal of existing or treated radioactive or hazardous wastes.

Under the Separations Alternative, approximately 22 acres of previously undisturbed land outside of the INTEC facility boundary would be committed to disposal of low-level waste Class A (Full Separations Option) or Class C (Transuranic Separations Option) type grout. In the absence of reclamation, some marginal wildlife habitat associated with this area would be lost.

Activities at the INEEL have resulted in the irreversible and irretrievable commitment of groundwater in the Snake River Plain aquifer that has been affected by chemical and radioac-

Environmental Consequences

tive contaminant plumes. These plumes occur in localized areas within the INEEL site boundaries. Services lost from these commitments include limits on the location of certain types of wells, such as drinking water wells or the volume of water pumped from the aquifer by DOE for activities on the INEEL site. All potable water wells on the INEEL site are routinely monitored to ensure that water withdrawn from the aquifer is utilized appropriately, as specified under Federal and state regulations. Risk of future contamination of groundwater underlying the INTEC, and hence commitment of the groundwater resource, is highest under the No Action Alternative.

The construction materials (sand, gravel, pumice, and landscaping cinders) extracted on INEEL would be irreversibly and irretrievably committed in support of activities associated with waste processing and facility disposition. Aggregate would also be used during construction for concrete production, foundation preparation, and road construction and maintenance. Some materials used for facility construction, such as structural steel, could ultimately be recycled depending on market conditions. All of these materials are plentiful in supply. Material consumption for this purpose would not lead to shortages in the availability of these materials.

Material requirements for treatment of wastes would vary with alternative and treatment option as described in Section 5.2.13. The maximum quantities of each material (in cubic meters) that could be consumed under any alternative are as follows: argon gas (1,200); blast furnace slag (6,400); cement (5,800); clay (8,500); fly ash

(6,100); glass frit (7,800); silica (2,300); sodium hydroxide (500); titanium (or aluminum) powder (240). Not all types of materials would be required under all treatment options, and only the maximum amounts required under any option are listed. For example, argon gas, silica, and titanium (or aluminum) powder would be the only materials required for the Hot Isostatic Pressed Waste Option of the Non-Separations Alternative, and these materials would not be required in any quantity by any other option.

Consumption of fossil fuel during the construction phase would be highest under the Full Separations Option, which would require 480,000 gallons of fuel per year. The peak annual fossil fuel usage for operations is also highest under the Full Separations Option at 4.5 million gallons per year. All other alternatives would consume substantially less fossil fuel during both construction and operations phases.

The Planning Basis Option has the highest requirement for electrical energy during the construction phase. This option would require up to 6,500 megawatt hours per year during construction. All other alternatives have lower requirements for electrical energy. The Planning Basis Option also has the highest operations-phase energy requirement, 50,000 megawatt hours per year. All other alternatives have would lower requirements for electrical energy.

Annual energy requirements for facility disposition, including decontamination and decommissioning of new waste processing facilities and closure of existing facilities, would be much lower than peak energy demands identified for waste processing.